

# Industrial Standardization

*and Commercial Standards Monthly*



May

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1936

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# Lightning Arrester Standards Approved

by

**K. B. McEachron<sup>1</sup>**

*Former Chairman, Subcommittee  
on Lightning Arresters, A.I.E.E.  
Committee on Protective Devices*

**A** LIGHTNING arrester is a device which has the property of reducing the voltage of an impulse applied to its terminals, is capable of interrupting follow current if present, and restores itself to its original operating condition." Thus the standard just issued defines a lightning arrester. The purpose of the arrester is to reduce dangerous transient voltages, which may appear on circuits, to values which are safe for connected apparatus. To accomplish this purpose, it is necessary to set up tests which will determine the strength of the apparatus, and the potential allowed by the arrester under certain conditions. Considerable progress has been made in this direction in recent years, which has only been possible through the use of the cathode-ray oscillograph and the impulse generator in the testing laboratories of the manufacturers.

The lightning arrester standards not only define the special technical terms used in the lightning arrester art, but also set up or suggest certain tests by which the performance of a lightning arrester may be judged. They apply only to lightning arresters used for power applications, and not for telephone circuits, signal circuits, and other low voltage equipment.

The performance of a lightning arrester depends upon three characteristics or properties:

- (a). Ability of the arrester to protect. Its voltage-time characteristic, taken with the cathode-ray oscillograph under prescribed conditions, is a measure of this ability.
- (b). Ability to perform its unit operating cycle, which includes the application of impulse while rated generated power voltage is applied, following which the ar-



*General Electric Co.*

Natural lightning breaking over Croton Dam, Mich., during tests of effect of lightning on transmission lines. New information gained from such tests made possible approval of the American Standards for Lightning Arresters.

rester should return to its original condition after the cessation of follow current.

- (c). Permanence, which involves the ability of the arrester to immediately repeat its unit operating cycle without the protective characteristics having been impaired. The measure of this ability can be expressed in terms of the number and frequency of such repeated cycles.

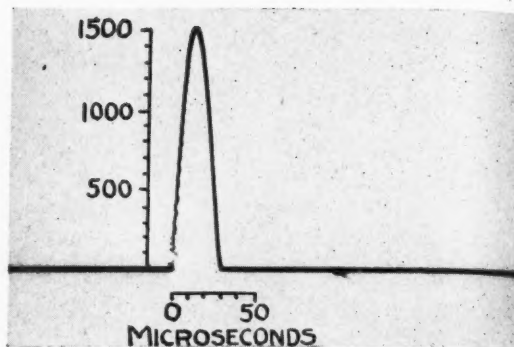
During the ten years that these standards have

**American Standards Provide Tests to Compare Types of Arresters and to Show What Protection Can Be Expected**

**New Knowledge of Effect of Lightning and Use of Instruments Makes Standard Tests Possible; Revisions Are Planned As New Data Becomes Available**

<sup>1</sup>General Electric Company, Pittsfield, Mass.

been in the course of preparation, a large amount of discussion has centered about the impulse tests, and this is not strange because knowledge concerning transients on circuits due to lightning has increased very rapidly during these ten years. Even as this is written, there is no agreement among authorities as to the rate of voltage rise due to lightning, and only within the past few months have data been available concerning the frequency of occurrence and the amount of current to be expected through lightning arresters in



**Ampere-Time Characteristics of a Lightning Arrester**

### A.I.E.E. Subcommittee Consults Industry on Draft Standards

The American Standards for Lightning Arresters (C62-1936) were developed by the Subcommittee on Lightning Arresters of the American Institute of Electrical Engineers' Technical Committee on Protective Devices.

Two editions of the standards were published by the Institute in order to stimulate comment and suggestion. The final edition, which was approved by the A.I.E.E. and submitted to the American Standards Association, combines the work and the experience of the A.I.E.E. Protective Devices Committee with the comments and suggestions received.

Members of the Subcommittee on Lightning Arresters are:

- I. W. Gross*, American Gas and Electric Company, *Chairman*
- H. W. Collins*, Detroit Edison Company, Detroit
- R. H. Earle*, Line Material Company, South Milwaukee, Wisconsin
- C. F. Harding*, Head, School of Electrical Engineering, Purdue University, Lafayette, Ind.
- K. B. McEachron*, General Electric Company, Pittsfield, Mass.
- J. R. McFarlin*, Electric Service Supplies Company, Philadelphia
- J. R. North*, Commonwealth & Southern Corp., Jackson, Michigan
- A. M. Opsahl*, Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.
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- A. H. Sweetnam*, Edison Electric Illuminating Company of Boston, Boston, Mass.
- J. J. Torok*, Corning Glass Company, Corning, N. Y.
- Herman Halperin*, Commonwealth Edison Company, Chicago, Ill.

service. In view of this situation, it has seemed wise to those responsible for setting up suggested impulse tests to make use of values which can be successfully obtained in the laboratories of the manufacturers, which will furnish a reasonable basis for comparison between different types of arresters. At the same time, the test should be such as to be a guide, at least, to the protection level to be expected in service.

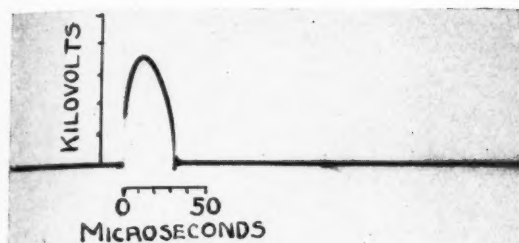
### Impulse Tests Complicated

In service, where the impulse travels to the arrester through the surge impedance of the transmission line, the crest current will be associated with the crest potential, but in the impulse tests, given in the appendix of the standards, it was necessary to specify the rate of voltage rise and the rate of current rise independently. In this regard, the testing of lightning arresters is very different from that of insulation, in which it is only necessary to specify the rate of rise and decay of the applied voltage.

The lightning arrester is expected to perform correctly with rapidly rising fronts, and therefore a rate of rise of 100 kv per microsecond was chosen for each 11.5 kv of arrester rating. Although this may not seem like a very rapid rate of rise, yet for an arrester designed to operate on a 115 kv ungrounded neutral circuit, the rate of rise is 1000 kv per microsecond, which is a rapid rate indeed. For higher rated arresters the rate is correspondingly higher.

The proper current to use in testing arresters has been the subject of a great deal of debate, and the value chosen of 1500 amperes, reached in 10 microseconds, is a compromise between limitations of testing equipment and the values which it is expected might be obtained in service. It is clear, of course, that to test high-voltage arresters with high currents, which persist for times of the order of 40 or more microseconds, requires very large and expensive impulse generators, and this





**Volt-Time Characteristics**

was an important factor in setting up tests on arresters by units.

The protection afforded by the arrester is judged from the cathode-ray oscillograms showing the volt-time characteristic under the given conditions of rate of voltage and current rise and duration of current. The shape of the current wave is determined by the ampere-time oscillogram.

To determine the ability of the arrester to perform repeatedly, 30 unit operating cycles are required at intervals not greater than one minute. Each unit operating cycle requires that the impulse be timed as early in each half cycle in which it is applied as will start follow current, otherwise at the crest of the generated voltage wave. This insures a test in which the greatest heating effect due to follow current can take place. In service, the conditions are less severe in that the impulse is not timed to give the maximum time of follow-current flow.

Since adequate standards have not been available, the industry has been using by common consent the interim reports of the subcommittee as a guide for the testing of lightning arresters. Such use has been indicative of the real need which has been felt for these standards.

To complete this standard has been difficult because of the rapidity with which the art has changed, but the time comes when it seems wise to form standards on the basis of the situation as it is without waiting for new developments and new knowledge. It is realized that these standards represent but a step in the progress of the art of protection of electrical equipment against the effect of lightning and other over-voltages.

#### **Australia and New Zealand to Agree On Standard Names for Apple Diseases**

Agreement on standard nomenclature for apple storage diseases is expected through cooperation between Australia and New Zealand, says the Ninth Annual Report of the Council for Scientific and Industrial Research of Australia. Exchange of specimens has shown that "corky pit" in the terms of New Zealand is identical with Australia's "internal cork."

### **American Standards Will Help Protect Electrical Equipment**

Lightning arresters are the safety valves of electric systems. Any sudden increase in the voltage—lightning on or near an electric power line causes such a sudden jump in electric voltage—could in one destructive flash disrupt expensive equipment and thus cut off the service. Lightning arresters prevent such catastrophes.

Again and again during the course of a year, they operate to reduce sudden attacks of alien voltage, divert the unusually large voltage to ground, and return again to their original condition.

Only recently has sufficient information about the effect of lightning on electrical circuits been available to make it possible for engineers to complete satisfactory standard tests for the performance of lightning arresters. Even now there is no agreement among authorities about the rate of the rise in voltage due to lightning.

The standards just approved, American Standard for Lightning Arresters (C62-1936), are only the first step in protection of electrical equipment against the effect of lightning. Research is still going on and as more information is gathered, these standards will be added to and revised.

### **Chile Expects Standards To Increase Fruit Export**

The Ministry of Agriculture declared today that an effort would soon be made to standardize methods of fruit cultivation in order to make Chile one of the most important exporters of out-of-season products to New York.

Packing houses, drying plants, cold storage and special railroad and shipping facilities are being considered in the plan. Recent exports to Europe have proved the feasibility of this plan, it was stated.

Shipping circles announced an agreement had been reached for the early establishment of a Chilean steamship line to Europe, with three modern vessels. Chile aims in this way to keep some of the foreign exchange now going to foreign companies.

# Machine Tests Will Help Women Select Best Wearing Shoes<sup>1</sup>

by

**R. C. Bowker**

*National Bureau  
of Standards*

THE multiplicity of styles and constructions of women's shoes create an air of confusion and wonderment in the mind of the consumer who decides to pass over the items of price and appeal in order to govern her selection on the basis of utility. What are the essential characteristics of a serviceable shoe? Is the welt shoe more durable than the stitchdown? Will the turn shoe hold its shape as well as the cemented shoe? Pertinent questions these which can only be answered at present by opinions and individual experience. Small wonder then that one large inquiring group of consumers, the General Federation of Women's Clubs, appealed to the National Bureau of Standards for assistance in establishing standards for women's leather shoes.

## *Women's Tests Uncertain*

Out of the myriad of items available for consideration in this problem two important ones seemed to be the ability of the shoe to hold its shape and the durability of the shoe as influenced by the type of construction. It is perfectly feasible to make shoes of every known type of construction, using in them similar materials and standards of workmanship. Such shoes could be subjected to actual wearing tests by a selected group of women and, from their reports and opinions, an idea could be obtained as to the most suitable types of shoe construction. The uncertainty attendant upon field work of this kind, together with the fact that the results are often modified by moods, opinions, and physical

## **National Bureau of Standards Builds Machine to Simulate Actual Conditions of Wear When General Federation of Women's Clubs Asks Help in Preparing Standards for Shoes**

characteristics of individuals caused this approach to the problem to be discarded.

Instead, the problem was assigned for study to the laboratory, where all conditions to which the shoe might be subjected could be rigidly controlled. The laboratory workers logically felt that an apparatus should be built for testing the endurance of the shoes and that the testing device should, in so far as possible, reproduce actual service conditions. The octopus-like arrangement shown in the accompanying illustration resulted.

The machine consists of eight radial cylinders having pistons ground to fit smoothly. These cylinders and their projecting pistons form, in effect, the spokes of a rimless wheel, and the whole is free to rotate about an axis. Four pairs of shoes, fitted to plastic rubber forms, are fastened to the movable pistons by adjustable hinged joints. The load applied to each shoe is controlled by an adjustable compression spring within the cylinders. An endless belt is driven across a bed of rollers by a motor and gear reducer and the radial cylinders are caused to rotate by contact of the shoes on the belt surface.

In operation, the heel of one shoe first comes in contact with the belt and, as the belt travels along, the sole and heel both press on the belt surface. The load on the shoe gradually increases and is at a maximum when the piston is perpendicular to the belt surface. As the shoe travels farther the load gradually decreases, the heel leaves the belt, and the toe is flexed somewhat as in walking.

<sup>1</sup>Publication approved by the National Bureau of Standards.

Motion pictures of persons walking were studied in order to develop a foot action which closely simulated that to which the shoe is subjected in service. The weight of the individual was considered in providing a range of pressure from 100 to 150 pounds. Other adjustments provided are the angle of contact between the heel and the tread and the amount of toe in or out of the shoe. The apparatus operates at twelve revolutions per minute.

The apparatus now having been developed, attention is being given to the determination of its value for the purpose intended. The welt, McKay, stitchdown and cemented types of constructions have been selected for the first studies. All the shoes will be made on the same lasts and of similar materials in so far as practicable.

Special attention will be given to the ability of these shoes to hold their shape and their resistance to breakdown. Examination of the shoes will be made by photographic methods, visual inspection, and mechanical measurements.

Information will also be sought, either incidentally or from individual series of tests, relative to the durability of shoe parts and accessories such as linings, heels, arch supports, counters, uppers, and toe caps.

The suitability of the apparatus for differentiating between different grades of shoes of the

same type of construction will be studied. Studies of the behavior of the shoes under simulated wet service conditions and when subjected to treatment with artificial perspiration are also planned.

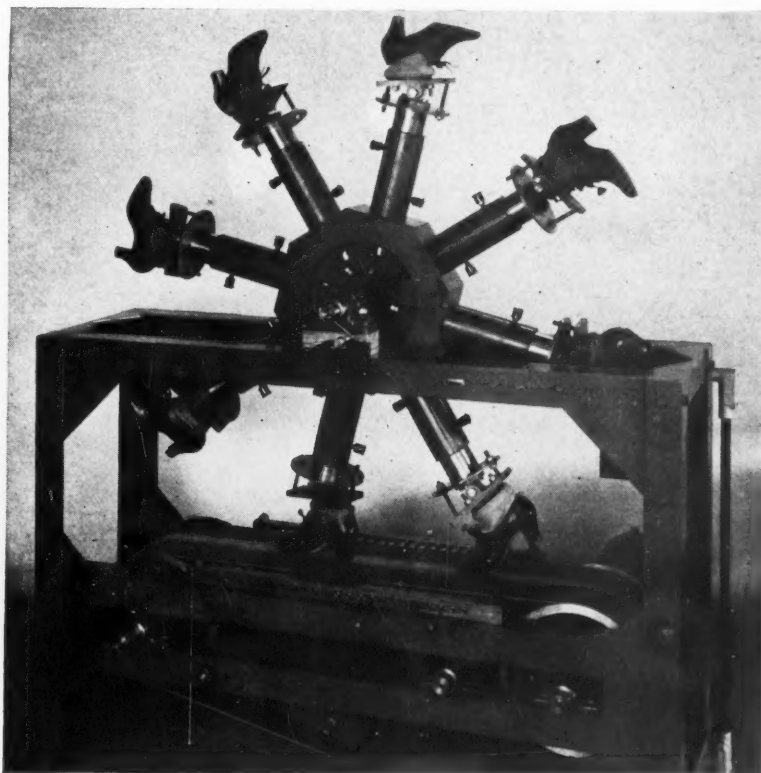
Studies on the effect of varying the fit of the shoe are also possible.

The apparatus is designed so that the soling material receives very little abrasive action and therefore no data on the wearing quality of the soling materials will be secured in this study.

### *Standards Are Goal of Tests*

The primary object of the work is to secure information which will be of assistance in establishing standards for shoes which have the most utility from the viewpoint of the consumer. The value of the results to manufacturers is not subordinated however since it is within the realm of possibility that certain processing operations and types of construction may be eliminated in the interests of standardization and economy to the producer as well as the consumer. Thus, in the language of the day, "Tireless Tillie" will be going "Round and Round" for many months to come in a persistent effort to enable milady more intelligently to select footwear best suited to her needs.

Motion pictures of people walking were studied in order to develop the proper foot action in testing these shoes. The heel of the shoe first comes in contact with the moving belt, then the sole and heel both press on the belt surface. The load on the shoe gradually decreases as the belt travels along, the heel leaves the belt, and the toe is flexed somewhat as in walking.



## Concrete Reinforcement Standards Approved by ASA, Have Wide Use

Three specifications for bars and wires for reinforcing concrete, submitted by the American Society for Testing Materials to the ASA, have been approved by the American Standards Association as American Standard. These specifications are:

- Billet-Steel Concrete Reinforcement Bars (ASA A50.1-1936; A.S.T.M. A 15-35)
- Rail-Steel Concrete Reinforcement Bars (ASA A50.2-1936; A.S.T.M. A 16-35)
- Cold-Drawn Steel Wire for Concrete Reinforcement (ASA A50.3-1936; A.S.T.M. A 82-34)

The American Society for Testing Materials has the responsibility for future revisions of these standards under the procedure of the ASA.

The A.S.T.M. Specifications for Billet-Steel and Rail-Steel Concrete Reinforcement Bars were first adopted by the Society in 1911 and 1913 respectively and specifications for cold-drawn steel wire for concrete reinforcement were first issued as tentative in 1921 and adopted in revised form in 1927. All three have been revised from time to time to keep them current with technical developments, and the latest revisions were made in 1934 and 1935.

These specifications are the basis of requirements for state and federal programs of highway

construction. They are also widely used by railroads and other groups in concrete construction.

All three of the specifications have been approved by reference and appended to the report of the Joint Committee on Concrete and Reinforced Concrete (American Concrete Institute, American Institute of Architects, American Railway Engineering Association, American Society of Civil Engineers, American Society for Testing Materials, Portland Cement Association).

These standards are incorporated into many of the leading building codes of municipalities throughout the country and are also included in those promulgated by the Pacific Coast Building Officials Conference, the proposed building code of the City of New York and in the appendix of the Building Code recommended by the National Board of Fire Underwriters.

For many years, a large proportion of the transactions involving the purchase and sale of the respective materials have been covered by these specifications.

Copies are available from the American Society for Testing Materials, 260 South Broad Street, Philadelphia, or from the American Standards Association at 25 cents each.

## California Uses American Standards In Accident Prevention Program

American Standards will form the basis of many of the safety regulations now being adopted by the California Bureau of Industrial Accident Prevention, according to C. H. Fry, chief of the Bureau.

Among the American Standard safety codes which are being studied or have been used in whole or in part in the Safety Orders issued by the Bureau are:

- Safety Code for Elevators, Dumbwaiters, and Escalators (A17-1931)
- Safety Code for Logging and Sawmill Machinery (B13-1924)
- Safety Code for Mechanical Power Transmission Apparatus (B15-1927)
- Manual for Safety in the Construction Industry (A10-1934)
- Safety Code for the Construction, Care and Use of Ladders (A14-1935)
- Safety Code for Mechanical Refrigeration (B9-1933)
- Safety Code for the Use, Care, and Protection of Abrasive Wheels (B7-1930)
- Safety Code for Power Presses and Foot and Hand Presses (B11-1926)

Safety Code for Protection of Industrial Workers in Foundries (B8-1932)

Safety Code for Floor and Wall Openings, Railing and Toe Boards (A12-1932)

Safety Code for Laundry Machinery and Operations (Z8-1924)

Safety Code for Window Washing (A39)

In addition to American Standard codes used by the Bureau, the Boiler Code of the American Society of Mechanical Engineers was adopted as the basis for the revised Boiler Safety Orders made effective January 1, 1936.

A list of the safety codes which have been approved by the American Standards Association is available from the ASA office upon request.

## Australia Asks Comment on Draft Standard for Obstetrical Beds

A draft standard specification for two-piece obstetrical beds has been issued by the Standards Association of Australia. Comments and criticisms of the draft have been requested by the Association.



## Huge Savings Made by British Chemical Firm, Official Reports<sup>1</sup>

**Company's Standards Program Brings Savings in Purchasing, M. Stilliard, Imperial Chemical Industries, Ltd., Tells London Branch of the British Industrial Purchasing Officers' Association**

THE standardization work being done by Imperial Chemical Industries, Ltd., is carried out by committees made up of representatives of each of the groups into which the activities of the company are divided. These representatives are men who have technical knowledge or practical experience of the materials their particular committee has under consideration.

Four committees have been set up—on Packages, Lubricants, Electrical Materials, and Engineering Stores.

The membership of the committee on engineering stores, the Standards Engineers Committee, is made up of the Standards Engineer of each group, and he is the focus point for this work within his group.

When this committee was set up, the Controller of Purchases put forward a list of items for its guidance. From the information at his disposal (*i.e.*, the number of contracts necessary or the wide range of varieties purchased) he was in a position to advise the committee which materials or articles it was most necessary to investigate.

### *Simplification First Step*

Simplification was the first step in the standards program.

Each group Standards Engineer was requested to forward to the secretary of the committee a full list of the types and sizes of the articles or materials at present being used by his group.

From the particulars provided by the groups the secretary prepared a schedule showing not only the complete range of types and sizes in use by all the groups, but also the approximate consumption of each item by each group.

These complete schedules were passed back to the group Standards Engineers with a view to their ascertaining how far their particular group could cut down the number of the types and sizes they had previously used.

The inclusion of the approximate total quantities used was very helpful from this point of view, because it was found, for instance, that one group had been ordering a certain size and ply of hose pipe in small quantities, whereas another group had been ordering a slightly different size in very large quantities. It was generally possible to persuade the group ordering the small quantities to adjust its size to that taken in much larger quantities, final settlement of such details being generally arrived at during one of the bi-monthly meetings of the committee.

### **54 Per Cent Reduction Shown in Stock Items**

Among other economies traced to the standards program of the Imperial Chemical Industries, Ltd., the company found that the original total of 15,346 items in stock was reduced to 7,108 items—a reduction of 54 per cent.

The range of tool steels used was reduced by 80 per cent.

In place of 100 grades of lubricants a specification was set up to provide for only 10 grades.

<sup>1</sup>Abstracted from the report of Mr. Stilliard's address, published in *Industry, Illustrated*, December, 1935.

Following agreement as to the items to be eliminated, final schedules are prepared and copies circulated for approval. A copy is passed to the standards division, which issues what we term a Standard Sheet, which forms part of our General Stores Simplification Book.

Copies of the General Stores Simplification Book are not only passed to all the factories, but also to members of the Purchasing Department. The standard sheet is of considerable assistance to the purchasing officer when placing contracts, because it is necessary to include only the types and sizes appearing on the standard sheet, and not, as formerly, covering probably the whole of the manufacturer's range.

A further advantage of the standard sheet is that it greatly facilitates the transfer of stock from one factory to another in case of emergency. It is possible for one group to see which of the other groups is most likely to have a stock of the material it requires, which can be transferred to it.

#### ***Reduce Schedule 54 Per Cent***

The total original schedule of 15,346 items has been reduced to 7,108 items—an average reduction of 54 per cent.

One of the most difficult items to deal with was tool steel, due to the greatly varying conditions among our factories. It was impossible to simplify tool steels in the same way as the other items, but such progress was made that the number of contracts has been reduced to one quarter of those previously necessary and the range in use by 80 per cent.

It is not difficult to see from the figures given how savings have been effected—by reduction of capital locked up in stores; by reduction of labor for handling stores; and by the reduction of clerical work keeping records; and finally, because fewer requisitions, contracts, and orders are necessary.

Standardization follows simplification and the simplified stores are adopted as standard by the issue of standard sheets which form our General Stores Simplification Book. For easy reference each subject is allocated a standard number which is taken from a series quite outside the range of numbers allocated to specifications. The color of the paper is also distinctive to the standard sheet.

There is also the question of the standardization of materials and articles not necessarily held in stock, and in our case this applied more particularly to certain electrical materials.

Standardization of electrical materials was effected by the Electrical Materials Standardization Committee, which was supplied by the Pur-

chasing Department with ranges of samples from which standards were agreed upon and a catalog of standardized electrical materials issued. This catalog is in effect the same as the standard sheets, contracts being made for the items included.

Conditions vary greatly at our factories, and where this variation has made a standard for the whole of the Imperial Chemical Industries impossible, each group agrees on standards for its own use. Care is taken when agreeing upon standards to avoid as far as possible any article or material that is not a standard product, otherwise the probability is that costs will be increased and almost inevitably delays in delivery will be occasioned.

#### ***Assists Manufacturer***

We are able to say with a greater degree of certainty what our requirements will be, thus assisting the manufacturer to arrange his production and to maintain a stock against future calls without undue risk. This is particularly so in the case of contracts covering an indefinite quantity over a certain period.

The final phase of standardization is by specification.

A specification not only defines in precise terms the purchaser's requirements, it also places all suppliers on one basis for bidding and becomes the standard for that particular material or article. We all know the difficulty in dealing with bids offering varieties of proprietary "branded" products; a specification cuts out that difficulty.

#### ***Reduce 100 Grades to 10***

Probably the best instance we have of standardization by specification is lubricants. We originally purchased over 100 qualities and grades of general lubricating oil, whereas we now have one specification covering ten grades only.

It is our policy to adopt, wherever possible, a British Standard Specification—the use of B.S. Specifications is not only of individual, but also of national importance. The wider the use made of a B.S. Specification, the greater the quantity of material produced to that specification, and the greater the quantity produced of the given material, the lower are the production costs and, we hope, the selling price, so that not only does the home consumer benefit but the manufacturer is in a better position to compete in foreign markets, which is of national benefit.

Notwithstanding the numerous specifications issued by the British Standards Institution, many of which have been adopted by us, it has been

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necessary for us to issue approximately 130 specifications of our own.

It is comparatively easy to write a specification to cover a given material, but it is also very easy to make the terms of a specification so stringent that the price is thereby increased. This is the reason I would emphasize the importance of manufacturers being consulted before a specification is officially adopted; otherwise there is danger of increasing the cost without obtaining any corresponding advantage.

We make a point of putting draft specifications before suppliers and request them to advise us on the following:

Does the proposed specification offer any difficulty regarding manufacture or would it affect price?

Is there any possibility of its occasioning delay in delivery?

### **Manufacturers Help**

Manufacturers, we find, are very willing to collaborate in this way.

We have in a number of instances been able to effect very considerable savings by the use of specifications.

To obtain the full value from the use of specifications it is necessary that adequate inspection of deliveries should be made to ensure that the terms of the specification are being complied with, and we either send an inspector to the manufacturer's works before delivery (this applies to plant more than general stores) or inspect upon delivery, as may be arranged.

We have also instituted a system of standard samples where there is a certain amount of difficulty in conveying quality or workmanship by specification. These standard samples are kept at the factories and a set at head office. They serve two purposes: they can be inspected by a supplier prior to tendering, and serve as a check against subsequent deliveries. Brushware is one of the instances where standard samples are used.

The Standards Division is a division of the Purchasing Department, under the Controller of Purchases.

Its function is to provide a focus point for the work within the purchasing department; it acts as publisher for all specifications and standard sheets compiled by the committees and is also responsible for the circulation of information generally (such as the advising of all concerned of the issues of new and amended specifications by the British Standards Institution); incidentally the division keeps a complete set of British Standard Specifications for reference.

The head of the division acts as liaison officer between the suppliers (in this case the purchasing officers) and the consuming factories, either through the I.C.I. Standards Engineer or the Group Standards Engineer as the case may be.

## **American Companies Tell How Standards Departments Work**

Methods of organizing company standards departments in the United States have been described from time to time in *INDUSTRIAL STANDARDIZATION* (formerly the *ASA Bulletin*). The following give definite information about how such departments function:

**Standardization and Inspection Play Important Part in New York Central Purchasing, Oct. 1930, p 24**

**Standardization as Developed in the New York Edison System, July, 1931, p 29**

**The Fundamental Role of Standardization in the Operations of the Bell System, Sept. 1931, p 3**

**Organization of Standardization Work in the Ingersoll-Rand Company, October, 1931, p 23**

**Engineering and Shop Standardization as a Means of Reducing Overhead (Harris-Seybold-Potter Company), December, 1931, p 33**

**The Application of Standards to Production Management (Reading Iron Company), May, 1932, p 141**

**Standardization as Developed in the Lamson & Sessions Company, October, 1932, p 251**

**Allis-Chalmers Finds Savings in Company Standards Program, April, 1935, p 88**

**The Standardization Work of the Detroit Edison Company. Reprints Available.**

A limited number of copies of these articles are available on request from the American Standards Association.

# International Committee on Weights and Measures Decides on New Basis for Electrical Units

by

**E. C. Crittenden**

*National Bureau of Standards  
Vice-Chairman, ASA Sectional Committee  
on Electric & Magnetic Magnitudes and Units*

**E**LECTRICAL measurements are now so widely used in all branches of engineering and industry, as well as in purely scientific work, that any important change in the units of electricity would be of general interest.

The units now in use, called "International," date from the Chicago Electrical Congress of 1893 in principle. Their legal basis in this country is the act of July 12, 1894. Some modifications of details were made by the International Conference of London in 1908, and precise values represented by practical standards were established by an International Technical Committee working at the National Bureau of Standards in 1910. The units (ohm and volt) then established have been maintained as closely as possible since that date by groups of resistance coils and standards cells.

When the "International" units were defined, it was considered necessary to have the units represented by standards which could be set up independently in any laboratory. Ready reproducibility of the primary standards was considered more important than precisely correct relations of the units to the fundamental units of mechanics. So the ohm was defined as the resistance of a specified column of mercury, the ampere as the current which will deposit silver at a certain rate from a silver nitrate solution under specified conditions, and other units were derived from these two.

In actual practice, however, the system has not worked out quite as was expected. In the first

**Improved Methods of Measurement, Accurate to Parts in a Million, Make Possible Practical Electrical Units Based Directly on Absolute Measurements, Eliminating Physical Standards Subject to Change With Time**

**Revised Units Will be Effective January 1, 1940**

place, while the primary standards chosen would easily reproduce values to a few parts in 10,000, their improvement so as to reduce the uncertainty to a few parts in 100,000 proved to be very difficult. In the second place, standard cells and wire resistance coils were improved so that values of units could be maintained over long periods of time with such certainty that parts in 1,000,000 became significant.

Simultaneously with this development of dependable reference standards came the rise of the great national standardizing laboratories, especially in Germany, Great Britain, and the United States, and of other laboratories more or less comparable in several other countries. The availability of the services of such laboratories has had a profound effect on the status of units and standards. No one outside of such laboratories now expects to set up his own electrical standards, and ready reproducibility of primary standards is therefore of little importance. On the other hand, the inter-relations of different

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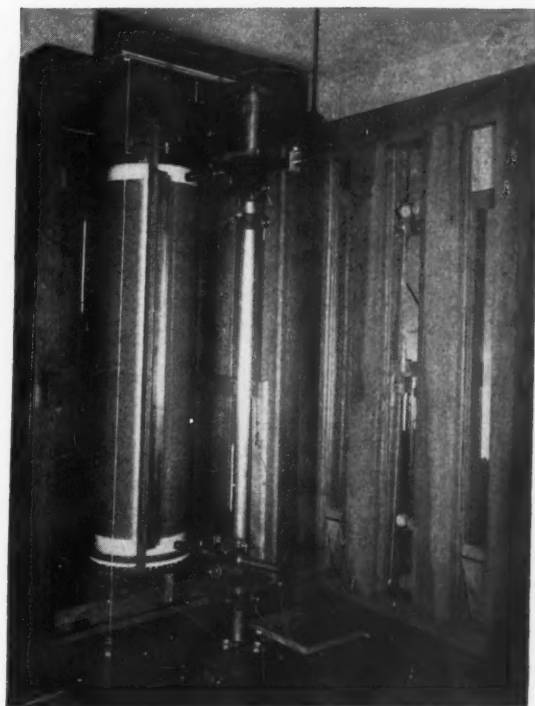


branches of knowledge have become more important, and the increased use of electrical measurements in all kinds of work has made it more desirable to have electrical units concordant with others. For example, the departure of the electrical joule and watt from the corresponding mechanical units has been a hindrance to the use of these units in the recent work on properties of steam, and the use of the necessary correction factors in such cases would undoubtedly become more and more of a nuisance as the precision of industrial data is increased in the future. Consequently it has seemed appropriate to weigh the relative advantages of maintaining the present system of units and of adjusting them at some temporary inconvenience in order to have a system better adapted to future needs.

### ***International Action on Units***

The legal mechanism for international collaboration in problems of measurement is the International Committee on Weights and Measures. Jurisdiction over electrical units was given to the International Committee in 1927, and the national laboratories were brought into its scheme of organization through the formation of an international Advisory Committee on Electricity, on which six of the laboratories are represented.

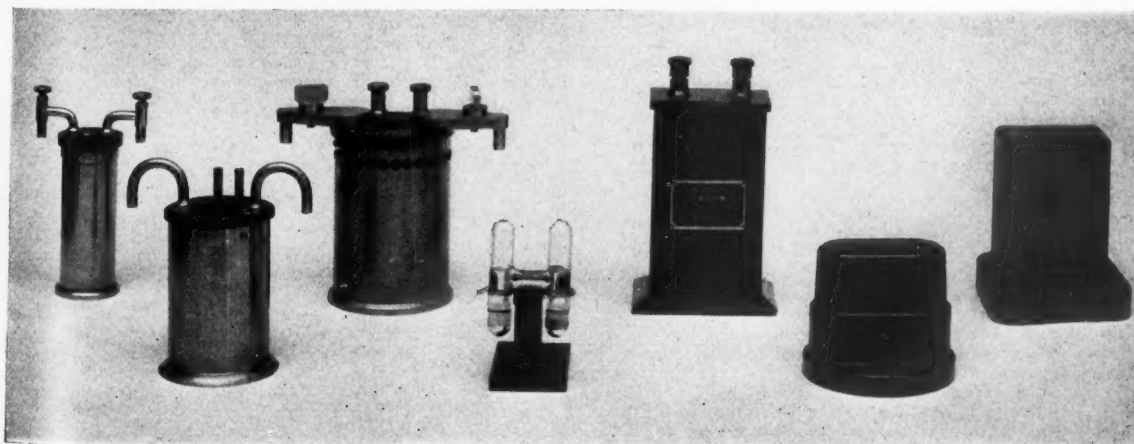
When this new organization for work on electrical units was set up, the first step taken by the National Bureau of Standards was the formation of an American Advisory Committee including representatives of all national organizations in this country interested in precise electrical meas-

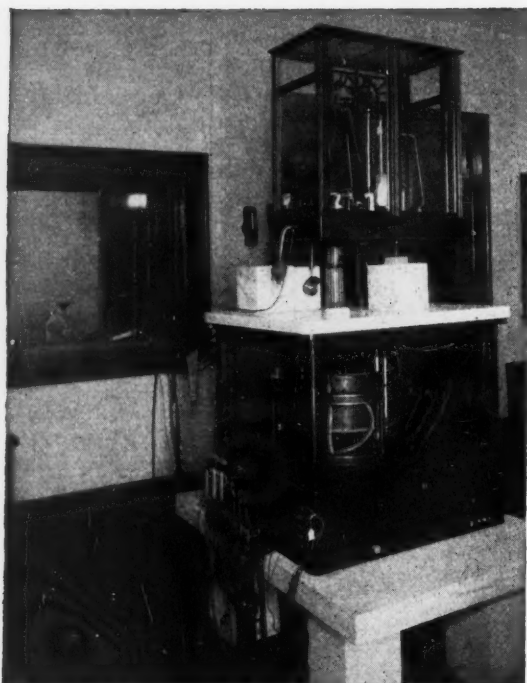


**Inductance Coil Used in Establishing the Henry and the Ohm**

The coil is wound in a single layer on a cylinder of fused quartz. Its length is compared directly with a standard meter bar mounted vertically beside the coil. The heat-insulated cabinet is open to show relative position of coil, meter bar, and cathetometer.

**Resistance coils and standard cells of the types shown constitute the basis of all precise electrical measurement. In the center is the Weston normal cell of the type used by the national standardizing laboratories to maintain the volt; at the right three portable standard cells as supplied commercially. The three at the left represent successive steps in the development of the cells at the National Bureau of Standards.**





**The Current Balance As Actually Used**

The Two Fixed Coils Can Be Seen in the Lower Case. The Moving Coil Suspended from the Balance Arm is Enclosed. Weighings are made by an Observer Outside the Room Through the Window at the Left.

urements. This American Committee recommended that the practical electrical units be revised to make them concordant with the fundamental mechanical units.

The recommendations of the American Committee were unanimously adopted at the first meeting of the international Advisory Committee in 1928. In order to carry them into effect it was necessary to make new absolute determinations of the values of the units. A program of such determinations was begun in five of the national laboratories, and it was expected that the new values of the units could be established in 1935. In all the laboratories, however, it has been difficult to support such work during the past few years. The National Bureau of Standards is the only one which has yet published its results.

At the 1935 meeting of the International Committee it was decided to set January 1, 1940, as the date for introduction of the new values into actual use. In the meantime, comparisons must be made between the results of determinations in various laboratories, and agreement reached upon the values which are best in the light of the

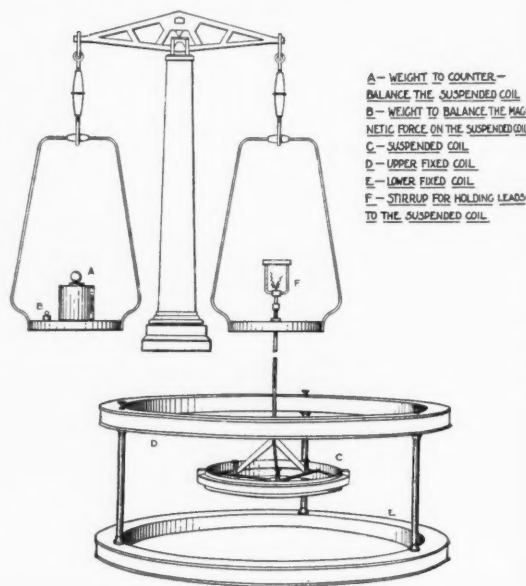
combined results. It is hoped that the absolute values can be established with an uncertainty of only a very few parts in 100,000. Measurements already made on standard resistance coils and standard cells show that a precision of a part in 1,000,000 can be attained in comparisons between laboratories. Consequently it is planned to assign values for the practical reference standards to this precision. In other words, in electrical measurements uniformity between countries to a few parts in 1,000,000 may be expected, although the relation to fundamental units will be subject to an uncertainty of ten times that magnitude.

While the change in principle will be radical, the change in magnitude of the units which is to be made effective on January 1, 1940, is not great enough to trouble any one except laboratories making precise measurements, since the largest adjustment necessary will be 1/20 of one per cent. The changes in the various units can already be predicted to the fourth decimal place, and the values of the present "international" units, in terms of the new or absolute units are as follows:

1 Ampere	International	=	0.999 9	Ampere	Absolute
1 Ohm	"	=	1.000 5	Ohm	"
1 Volt	"	=	1.000 4	Volt	"
1 Henry	"	=	1.000 5	Henry	"
1 Farad	"	=	0.999 5	Farad	"
1 Watt	"	=	1.000 3	Watt	"
1 Joule	"	=	1.000 3	Joule	"

#### Diagram Showing Principle of the Rayleigh Current Balance

An Electric Current Flowing Through the Coils C, D, and E is Measured by Weights Balancing the Electromagnetic Force Exerted on C.



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## A.S.T.M. Plans Standard Tests For Soils Used in Engineering

A new committee with the tentative title "Soils for Engineering Purposes" is to be organized by the American Society for Testing Materials. Work on the development of this new committee is already under way.

In 1935, through the work of the Subcommittee on Soil Testing of A.S.T.M. Committee D-4 on Road and Paving Materials, the Society issued nine methods of testing soils. These tentative standards, although limited to the use of soils for highway construction, can for the most part be considered for broader application. The new committee is expected to take over the work of this subcommittee and expand it.

It is believed that the American Society for Testing Materials can render a definite service in undertaking study of soils and standardization of methods of determining their various properties. A survey made in 1932 indicated that more than half of the states relied in varying degree on subgrade properties as factors in highway design and some 13 of these had laboratories equipped to perform various routine tests including those suggested by the U. S. Bureau of Public Roads. A great deal of work has been done recently by various branches of the Government in connection with foundation surveys for huge dams that are being built.

C. A. Hogentogler, Senior Highway Engineer, U. S. Bureau of Public Roads, who is chairman of the D-4 Subcommittee on Soil Testing, has been appointed to serve as temporary chairman of the new committee, and H. F. Clemmer, Engineer of Materials, District of Columbia, will act as secretary, pending formal organization of the committee. Mr. Hogentogler's paper (with A. E. Willis) on "Subgrade Soil Testing Methods" which was presented at the 1934 A.S.T.M. annual meeting, won the award of the Charles B. Dudley Medal for that year in recognition of its outstanding merit as an original contribution on research in engineering materials.

## London Builders Praise Standards

There is much to be said for the aspect of standardization which is reflected in the work of the British Standards Institution. It can only result in good to the community if standardization is particularly directed to standardization of quality, and providing the efforts of its advocates were directed to improving the standards of work and its products. From

that point of view the labors of the officials and committees who form the British Standards Institution are beyond praise. In time to come, when a builder buys his materials he should be able to rely upon the goods he buys, and when a purchaser buys a house he should be able to feel that his house is built of materials which, although he cannot see them, he can rely upon as conforming with a proper, recognized standard of quality. *Monthly Report of the National Federation of House Builders, London.*

## Reaffirms Simplification Of Turnbuckle Sizes

Simplified Practice Recommendation R71-28, Turnbuckles, which establishes a simplified list of stock sizes of turnbuckles with and without stubs, and with hook, eye, and jaw ends, has been reaffirmed without change by the standing committee of the industry, the Division of Simplified Practice, National Bureau of Standards, just announced.

The turnbuckles with and without stubs range from  $\frac{1}{4}$  inch to 4 inches in diameter, and from 4 inches to 48 inches in size of opening. The turnbuckles with hook, eye, and jaw ends, range from  $\frac{1}{4}$  inch to  $2\frac{1}{2}$  inches in diameter and from 4 inches to 48 inches in size of opening.

Copies of this recommendation may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at five cents each.

## Suggests Revision of Iron, Steel Scrap Simplified Classification

A proposed revision of Simplified Practice Recommendation R58-28, Classification of Iron and Steel Scrap, just submitted to the Division of Simplified Practice of the National Bureau of Standards by the standing committee of the industry, would make certain modifications in the recommendation to meet current needs.

The recommendation specifies classes of scrap for blast, basic open-hearth, acid open-hearth, and electric furnaces; for gray iron foundry practice, Bessemer converters; and for miscellaneous scrap. A contract form for purchase of scrap is also included.

Copies of the proposed revision, in mimeographed form, may be obtained from the Division of Simplified Practice, National Bureau of Standards, Washington, D. C.

# Standardized Safety Program Reduces WPA Accident Rates

by

**W. O. Wheary**

*Director of Safety,  
Works Progress Administration*

**M**AKING use of standard safety instructions and safety codes in a thoroughly standardized safety program, the Works Progress Administration has reduced the rate of time lost through accidents to 21.6 per 1,000,000 man hours from a previous 41.0 under the earlier Federal Works Program of the Civil Works Administration. This record is based on a program of over one billion man hours and includes statistics for work projects in every state, county, and city in the United States.

Because the immediate purpose of the government work program was to increase employment, it was not always possible to place men according to the normal methods of industry. To compensate for the extra hazards arising from inexperience of the workers, absence of recent contacts with industrial discipline, and other problems inevitably connected with the huge volume of new employment it was necessary that an unusual effort be made to educate the foremen and workers to protect themselves from injury.

## 3,000,000 Men Employed

The extent of the problem, involving as it did the employment of approximately 3,000,000 men in a few months, indicated the need for a special mobilization of forces if the safety problem were to be solved. It was evident that the varied local practices current in the different parts of the country could not be depended upon, so that a carefully organized Safety Division was set up to put a standardized safety program into practice in all parts of the country and in all of the varied undertakings of the Works Progress Administration.

The first requirement was a standard manual

**WPA Uses Many American Standard Safety Codes as Basis for Regulations Applying to All Projects**

**Accident Rate Falls From 41.0 to 21.6 per 1,000,000 Man Hours**

of instructions to tell how each job—excavating, blasting, quarrying, demolition, building—could be done with the least danger to the worker. It was necessary to study existing safety standards, adapt them, and bring them together into a thorough and well-balanced manual. A committee of experts interested in the safety problem, who had had experience with it in industry and insurance, was appointed to do this work.

The National Safety Council, the American Standards Association, and the Government placed their facilities at the service of the committee. As a result, the safety manual used by the Works Progress Administration incorporates authoritative standards for safety in construction and makes use of the best experience of the national organizations which have developed safety code programs.

The manual gives detailed instructions concerning the most exacting problems of safety in construction work. Safety equipment, sanitation, proper care of materials, methods of constructing tunnels, and pits, use of hoists, derricks, and ladders, handling materials, safe loads for ropes and chains, proper care and use of trucks, proper use of tools, boilers, dust hazards, first aid, are only a few of the problems for which standard safety practices have been issued.

Some of the safety standards studied by the



committee and used as the basis for the safe practices required by the Manual include:

National Safety Council Safe Practices pamphlets  
State Laws  
American Standards for Safety in the Construction Industry (A10-1934) (Associated General Contractors Manual)  
American Standard Safety Code for the Construction, Care, and Use of Ladders (A14-1935)  
American Standard Safety Code for Automobile Brakes and Brake Testing (D4-1927)  
American Standard National Electrical Code (C1-1935)  
American Standards for Prevention of Dust Explosions  
American Standard Code for Identification of Gas-Mask Canisters (K13-1930)  
American Standards for Industrial Sanitation (Z4.1-1935, Z4.2-1935, Z4.3-1935)  
American Standard Safety Code for Floor and Wall Openings, Railings, and Toe Boards (A12-1932)  
Code for Head and Eye Protection

Revision of the manual to keep it up-to-date with development of new methods and experience is provided through the Federal Director of Safety at Washington.

Safety codes must be used before accidents can be prevented, however, and to make sure that the safety instructions outlined in the manual were put into practice it was necessary for the WPA to set up an organization to supervise the accident prevention program.

District managers of the WPA were coached on these new aspects by WPA headquarters. Key men with previous industrial safety experience were appointed to supervise the decentralized safety program in each state. They directed the WPA foremen in their districts, taught them to keep a close watch on working methods on the projects, organized foremen training classes, and supervised the accident-reporting system. Many workers were delegated and trained to specialize on this work.

The efficiency of the campaign is shown in the frequency rate of 21.6 disabling injuries for each million man-hours worked, and the ratio of one accidental death to every 7,000,000 hours of exposure. Some localities, in which there is a considerable amount of construction work being done, have worked from fifteen to twenty million hours before a man has been killed.

It should be mentioned that responsibility is assumed for the deaths of workers who are killed while being transported to or from remote projects. Also, all injuries are reported which result in either an actual loss of time or merely the inability of a worker to return to his regular job on the next shift. It follows from the prevention purposes in mind, which are mainly dictated by

the humanitarian aspects of the program, that an appreciable percentage of fatalities and injuries are incorporated in the statistics that would not ordinarily be included in similar tabulations of industrial casualties.

The type of work which employees of the WPA have been doing ranges from demolition and new building construction, and road and bridge building, to sewing-room projects and educational and social service activities for the women. In many sections, work of an extremely hazardous nature has been undertaken.

The following list of fatalities rates per million man-hours indicates the steady improvement as the safety program became more standardized:

Civil Works Administration:	
November 23 - December 28, 1933	.39
January 4 - April 25, 1934	.26
Federal Emergency Relief Administration	.25
Works Progress Administration	.16

Accident experience on projects of the Works

**Excavation work at Grand Coulee Dam was made safe by use of safety belts. Safe loads and proper use of ropes are specified in the WPA Safety Manual.**

*Times-Wide World photo*



Progress Administration, both as to the prevailing types of accidents and the per cent of injuries listed under each type, is in line with that of construction generally as reported to the National Safety Council. Since, however, non-compensable as well as compensable injuries are included in the accident statistics of the Works Progress Administration, the inference is that the record of the latter is actually somewhat better.

The improvement can definitely be traced to the standardized educational program conducted in practically every hamlet in the country, and to the application of these standard methods in the face of the great risks involved when such an immense number of men are working on unfamiliar tasks under emergency conditions of transportation, location, and foremanship.

### **Simplified Colorimetry Apparatus For Scientific Control of Sugar Manufacture**

A new method for measuring the color of sugar, by a process worked out at the National Bureau of Standards, is described in the April issue of the *Journal of Research* (RP878, Government Printing Office, Washington, D. C.)

The sugar technologist, in order to meet the demands of commerce and to control his processes of manufacture, must be able to measure sugar color accurately and to express the results of measurement in terms that have a rational meaning and that may be of practical value when included in the computations involved in the scientific control of sugar manufacture.

Until about 1920, the only method of sugar colorimetry was that devised by Carl Stammer, an eminent German sugar technologist, and described by him in 1860.

In the Stammer colorimeter the attempt is made, by measurably varying the depth of a sugar solution, to match the intensities of the light transmitted by the solution and by a standard composed of a yellow glass plate—daylight or other white light being the source of illumination. Unfortunately the spectral transmission and quality of color of Stammer glasses or of any other yellow glass are never the same as that of sugar solutions, and accurate matching is impossible. Various substitutes for the yellow glasses have been proposed but none of them, for one reason or another, has been found reliable.

As a result of investigations at the National Bureau of Standards, a method has been developed for accurately matching these intensities.

Instead of employing the entire visible spectrum of an incandescent light source, an isolated

and relatively narrow position of the spectrum is used in such a way that light of virtually one effective wave length reaches the eye after passage through sugar solution and transmission standard. By choice of the proper wave length the color of the solution may be measured. A simple way of accomplishing this is described in the paper. The comparator is an instrument of standard design illuminated with an incandescent tungsten source from the light of which narrow spectral bands are isolated by means of special filters. Comparison is made with a glass plate calibrated in terms of transmission.

### **Issues Report of Conference On Weights and Measures**

The report of the Twenty-fifth National Conference on Weights and Measures, held June 4 to 7, 1935, has just been published by the Government Printing Office. The conference was the first since 1931 and the report shows developments in the field of weights and measures during the past four years.

The report also contains a number of papers of general interest. Federal legislation relative to standard containers and food and drug control is reported upon, as well as methods for testing beer barrels and the control of "bootleg" coal and gasoline. There is also a paper on the methods used by the State of New Jersey in the supervision of the buying of old gold.

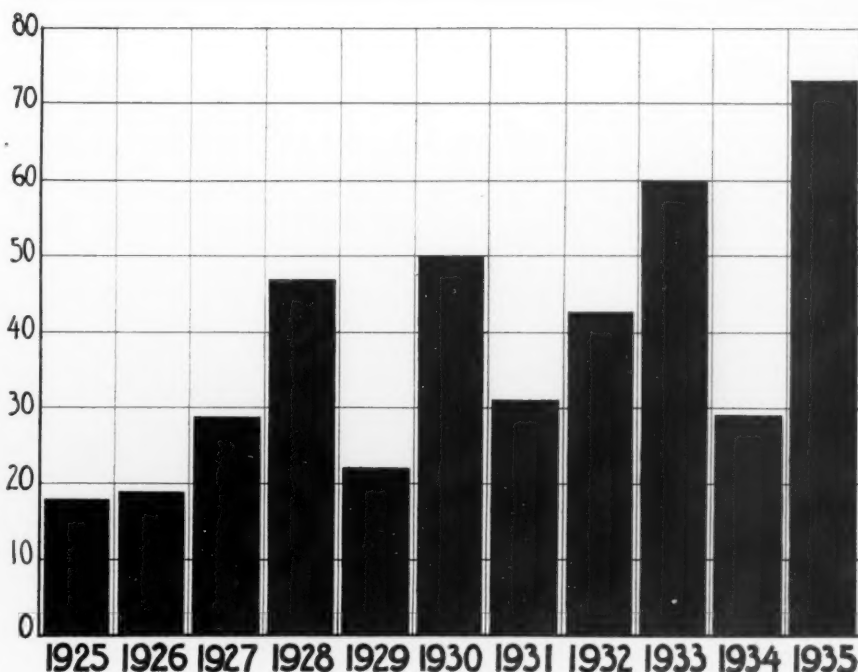
Important subjects considered during the conference on weights and measures and included in this report covered the effect of changes in temperature on the volume of gasoline in underground storage, gasoline losses in storage and handling, the use of sealed cans in dispensing lubricating oil, and specifications and tolerances for vehicle measuring tanks.

Copies of the report are available from the superintendent of Documents, Government Printing Office, Washington, D. C., at 20 cents each.

### **A.S.T.M. Committee Organizes To Prepare Tests for Fabrics**

Standard test methods and specifications for household and garment fabrics will be developed by a new subcommittee authorized by Committee D-13 on Textile Materials of the American Society for Testing Materials, the A.S.T.M. announced. Organization of the new subcommittee, which will prepare specifications and tests for piece goods and tests for the fabric in finished

**Number of Standards Approved by the American Standards Association Has Shown Steady Increase Since 1925**



articles, was authorized at the recent meetings of Committee D-13 in Washington. The decision, which had been given careful consideration by the committee, resulted from repeated requests from home economists for assistance in the development of accurate methods of evaluating fabrics.

The committee also decided to extend its work to include the establishment of standard specifications and test methods for textile chemicals. The subcommittee on bleaching, dyeing, and finishing was requested to assume this work as one of its major programs.

The subgroup on light and medium-weight fabrics recommended revisions in the Standard Methods of Testing and Tolerances for Certain Light and Medium Cotton Fabrics (D 274-34) and in the Standard Specifications and Methods of Test for Cotton Goods for Rubber and Pyroxylin Coating (D 334-34) to bring them in closer conformity with the Worth Street Rules, 1936. The proposed revisions involve the reclassification of the fabrics and the incorporation, as tentative, of Specifications G of the Worth Street Rules to apply to certain fabrics covered by these two A.S.T.M. specifications.

Other recommendations included complete revision of the standards covering General Methods of Testing Woven Textile Fabrics (L5-1934; A.S.T.M. D 39-34), Methods of Testing and Tolerances for Cotton Yarns, Single and Plied (A.S.T.M. D 180-33) and for Cotton Sewing Threads (A.S.T.M. D 204-33).

The committee's program of activities includes the following: Development of microscopical methods for the quantitative analysis of fiber mixtures which cannot be analyzed by chemical or mechanical procedures; lopp and evenness tests for cotton yarn; specifications for yarn made from wool mixed with other fibers; fading standards and methods of testing wear for pile floor coverings; sulfuric acid method for analysis of cotton-wool mixtures.

### International Meetings Will Be August 31-September 13

The series of meetings to be held under the auspices of the International Standards Association (ISA) in Budapest this summer will be held during the two weeks beginning August 31, 1936, and not on September 14, as tentatively announced in the article published in the April issue of INDUSTRIAL STANDARDIZATION, p 84.

The list of ISA projects in which American industry is cooperating, published in the article (pp 85-86) should be complemented as follows:

#### Pigments—ISA 35

Dr. H. A. Gardner, Chemical Engineer, the Institute of Paint and Varnish Research, Washington, D. C. *Alternate:* M. Rea Paul, Consulting Colorist, the National Lead Company, Brooklyn, N. Y.

#### Upholstery Hair

B. H. Blocksom, president, Blocksom & Company, Michigan City, Ind.

# Trees Take Less Toll of Electric Wire When Coverings Meet Standard Tests

by

**D. S. MacCorkle<sup>1</sup>**

*Chairman, Technical Committee  
on Fibrous Coverings of the  
Sectional Committee on Insulated  
Wires and Cables*

**S**TANDARD performance test specifications for coverings of "tree wire," the insulated electrical wire strung through the tree tops, completed and approved by the American Standards Association as American Tentative Standard Specifications for Tree Wire Coverings (C8.36-1936), already have more than doubled resistance to abrasion in the more popular makes of wire.

"Tree wire" is an abbreviated description for a conductor insulated with rubber compound and covered with a protective abrasion-resistant covering which is used for the extension of overhead electric distribution lines through trees. The wire rubs against the branches of the trees, hence the requirement for abrasion resistance. Inasmuch as continuity of service is becoming a more and more important consideration in supply of electric power, use of this material has been comparatively large during the past few years.

## "Tree Moulding" Used

Some electric utility companies have used tree wire protected with wooden "tree moulding" or guards at locations where the installed wire is subjected to abrasion. This practice, of course, does not utilize the abrasion resistance of the covering. However, with the improvement in various makes of tree wire during the past two or three years, it seems that this additional protection is not necessary except under severest conditions.

<sup>1</sup>New York & Queens Electric Light and Power Company.

## Continuity of Electric Service Demands Elimination of Tree Interference

### Tests Show How Insulated "Tree Wire" Melts, Drips, Bends, Resists Moisture, and Reacts to Abrasion; Aging Test May Be Included Later

At the present time, the more extensively used tree-wire constructions utilize a fibrous covering which may be included under one of the following descriptions:

1. Treated circular-loom cotton braid.
2. Treated circular-loom braid of cotton and other more abrasive-resistant material.
3. Helically applied hard and flexible fibre tape covered with a treated cotton braid.
4. Helically applied and specially treated woven fabric tape covered with a treated cotton braid.

Other constructions have been used less extensively. One novel construction worthy of mention consists of a conductor insulated with a special weather- and abrasion-resistant rubber compound.

In view of the considerable amount of tree wire used, and of the various constructions available on the market, it is evident that there has been need for an American Standard. Some utility companies have themselves prepared and used specifications for this class of material. Such practices together with the cooperation of the manufacturers, have resulted in improvements.

Both the manufacturers and the users, however, have recognized the need for standard specifications for this material, and Technical Committee



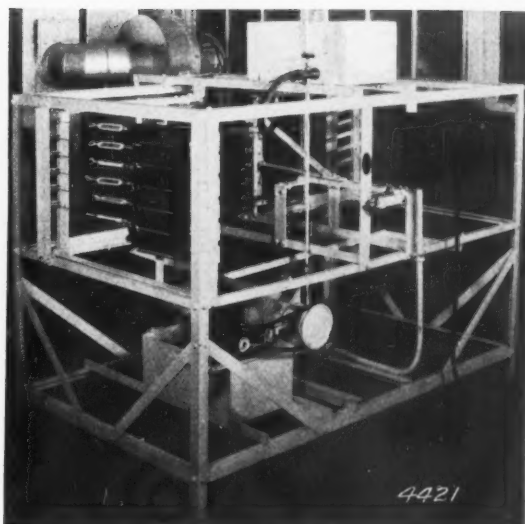
8 on Fibrous Coverings, ASA Sectional Committee on Insulated Wires and Cables, was instructed to undertake the preparation of such a standard.

Section 3, Technical Committee 8, consisting of the following personnel, was organized to prepare these specifications: E. H. Carr, L. L. Carter, G. J. Crowdes, H. G. Hough, D. S. MacCorkle, R. A. Schatzel, R. H. Titley, E. D. Youmans.

At the outset of this work it was considered advantageous to prepare specifications limiting certain characteristics, and eliminating only the poorer grades of tree-wire coverings on the market. Existing specifications, associated investigations of tree wire tests and operating experience, and the American Standard Specifications for Weather-Resisting Wire were used as a basis of preparation.

Obviously, the specifications had to be of the performance test type. The following tests were included: melt, drip, bend, moisture, and abrasion.

The first four of these tests required little development due to the fact that the characteristics for which they are used as checks are com-



**This Machine Is Used to Show What Happens to Electric Wire When Branches of Trees Rub Against It.**

### **Committee On Wires and Cables Represents Varied Interests**

A group of experts with widely varying interests in the electrical field are in charge of the general project on insulated wires and cables under which the work on "tree wire" is classified. A technical subcommittee did the preliminary work of preparing the standard specifications. After the draft standard prepared by the subcommittee was approved by the sectional committee, it was submitted to the Electrical Standards Committee, the general administrative committee directing the electrical standards program of the American Standards Association, and was finally submitted and approved by the Standards Council of the ASA.

The Sectional Committee on Insulated Wires and Cables (C8) is made up of the following members:

**F. M. Farmer, American Society for Testing Materials, Chairman**

**G. M. Haskell, National Electrical Manufacturers Association, Vice-Chairman**

**W. F. Davidson, Electric Light and Power Group, Secretary**

American Institute of Electrical Engineers, *W. A. Del Mar, E. B. Meyer, J. B. Whitehead*

American Society for Testing Materials, *W. H. Bassett, R. W. Chadbourne, Malcolm F. Farmer*  
American Transit Association, *C. R. Harte, F. J. White*

Association of American Railroads, Engineering Division, Electrical Section

Association of American Railroads, Engineering Division, Signal Section, *J. J. Corcoran*

Association of Railway Electrical Engineers, *J. R. Sloan*

Bell Telephone System, *C. S. Gordon*

Electric Light and Power Group, *R. N. Conwell, W. F. Davidson, C. T. Sinclair, A. B. Campbell (alt.)*

National Board of Fire Underwriters, *A. H. Nuckolls*

National Electrical Manufacturers Association, *W. H. Bassett, G. M. Haskell, C. O. Hull, Moss A. Kent, E. D. Youmans*

National Fire Protection Association, *R. B. Shepard*

National Municipal Signal Association, *Stanton S. Hertz, Dr. M. G. Lloyd (alt.)*

Society of Automotive Engineers, *F. W. Andrew, W. S. Haggott*

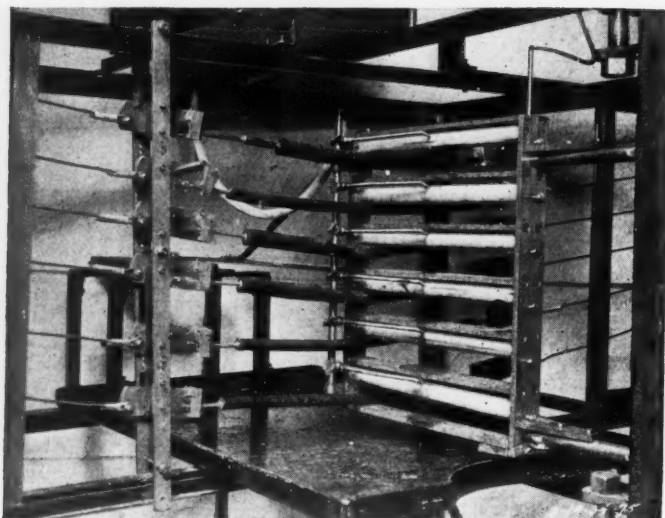
U. S. Department of Commerce, National Bureau of Standards, *Dr. J. Franklin Meyer*

U. S. Navy Department, Bureau of Engineering, Specification Section, Design Division, *Officer in Charge, Laboratory Officer (alt.)*

U. S. War Department, *Lieut.-Col. John W. N. Schulz*

Members-At-Large, *Dean Harvey, Philip Torchio*

## "When the Bough Bends—"



**The Wire It Rubs Against Is Frayed.  
Close-up Shows Abraded Coverings  
During Test.**

mon to both tree wire and weather-resisting wire.

The abrasion test presented more difficulties. Various users of tree wire have devised several abrasion tests to determine the abrasion resistance of tree-wire coverings. These included tests of the specimens in rigid and flexible positions. The problem resolved itself into selecting the proper test representative of operating conditions and practicable to make in the laboratory. The testing machine finally proposed by the committee is shown in Figures 1 and 2. Figure 1 is a general view of one design of the machine which is motivated with a  $\frac{1}{4}$  horsepower a-c motor with suitable reduction gears. Spring balances and turn buckles are used to indicate and adjust, respectively, the tension in the specimens. Provision also is made to subject the specimens periodically as abraded to water supplied from the tank observed in the top of the figure.

### **Show Abrasion**

Figure 2 is a close-up of the dowel carrier, showing the specimens of tree wire in test position and contacting the dowels for abrading the wire. The smooth cylindrical maple dowel,  $\frac{7}{8}$  inch in diameter and of definite hardness, is held firmly in a horizontal plane so that it will not move vertically. The specimens of tree wire, suspended between two points five feet apart in a horizontal plane, are pressed continuously against the dowel with a normal force of twenty pounds.

Abrasion is produced by the rotary movement of the dowels in a horizontal plane with a motion similar to that of the connecting rod of a reciprocating engine. As a measure of abrasion resistance, record is made of the number of complete cycles of the dowel as determined by a cycle counter. Reference to the specifications will reveal other detailed provisions of the test not included in this article.

Review of the standard Specifications for Tree-Wire Coverings (C8.16-1936) will show that no accelerated aging test, such as tests used in other specifications for materials as rubber compounds, is included. At the present status of developments it was considered inadvisable to include such a test until sufficient test experience with several procedures has been obtained. With this in mind as a requirement to provide for the protection of the purchaser, the following statement is included in the standard:

"Upon request of the purchaser, the manufacturer shall prove his ability to supply tree-wire coverings meeting the requirements of these specifications.

The manufacturer shall advise the purchaser of any change he has made or proposes to make in the material or construction of his tree-wire coverings as compared with that previously supplied."

### **Committee Continues Investigation**

The committee is continuing its investigation to determine what revisions of the standards will be advisable. Particular attention is being directed toward the development of a weatherometer test or a combined weatherometer and abrasion test to insure a true indication of the weathering and abrasion-resistant properties of the coverings.

Already the tentative specifications have created an improvement in the more popular makes of tree wire. Abrasion resistance has been increased more than two-fold and it is believed that weathering properties have not been sacrificed thereby. Both manufacturers and utilities have given favorable response to the use and development of these specifications. Cooperation from both branches of the electrical industry is commendable.

The Insulated Power Cable Engineers Association has worked jointly with the American Standards Association committee on the associated developments. Acknowledgment is made of the helpful guidance of those not directly associated in the work.

## American Standard Provides For Interchangeable Pipe Fittings

The American Standard for Brass Fittings for Flared Copper Tubes, just approved by the American Standards Association, gives detailed dimensional requirements for the brass fittings used on one type of joint to connect copper tubing. Manufacture of fittings to these standard dimensions will insure ready interchangeability and fit of copper tubing.

The brass fittings covered by the standard are designed for a maximum cold-water service pressure of 175 lb per sq in. gage, and the standard specifies material to be used, marking, size, and threading. The form of the screw threads conforms to the American Standard for Screw Threads for Bolts, Nuts, Machine Screws, and Threaded Parts (B1.1-1935).

### May Standardize Soldered Joints

It is expected that the sectional committee will start work on standards for soldered joints now that the standard for these fittings has been completed.

Interest in the standardization of the joints for copper tubing has increased recently because of the marked growth in the last few years of the use of copper tubing. For general engineering purposes, it has been used for steam, water, gas, oil, air, and vacuum lines, and it is also used under some conditions for water-service connections.

The type of joint best adapted for copper tubing depends on the kind of service in which the tube is to be employed. In some instances a connection made with the fittings just standardized is better and in others the soldered joint is preferable. It has been found that where machinery, apparatus, and instruments have to be dismantled and re-assembled at periodic intervals for inspection or repair, the use of these brass fittings on flared copper tubing has advantages. Wider use of copper tubing for water services for industrial or domestic purposes will depend to some extent upon modification of building and plumbing code requirements.

The development of this standard resulted from the early work on brass fittings and flared copper water tubes carried on by a subcommittee of the Copper Tube and Fitting Manufacturers Standardization Committee. After several meetings of the subcommittee in 1929 and 1930, a manufacturers' standard for this type of fitting was prepared. Requests of the subcommittee that the work be included in the program of the Sectional

Committee on Plumbing Equipment (A40) resulted in the organization by the sectional committee of Subcommittee 7 on Brass Fittings for Copper Tubes. Proof copies of the standard as prepared by this subcommittee were widely distributed for consideration by industry. After final study by the subcommittee, the proposed standard was approved by the sectional committee and by the organizations directing the work of the committee—the American Society of Mechanical Engineers and the American Society of Sanitary Engineering. It was then submitted to the ASA for approval.

Printed copies of the American Standard Brass Fittings for Flared Copper Tubes (A40.2-1936) are now available and copies may be ordered from the American Standards Association at 35 cents. Members of the ASA are entitled to 20 per cent discount on all American Standards ordered through the ASA office. Quantity discount prices are also available.

### Experts Prepared Standard On Brass Fittings for Tubes

A subcommittee of experts was named by the Sectional Committee on Minimum Requirements for Standardization of Plumbing Equipment (A40) to work out the details of the American Standard on Brass Fittings for Copper Tubes. The members of the subcommittee are:

**Fred L. Riggan**, Mueller Brass Company, *Chairman*

**Edward S. Cornell, Jr.**, American Radiator and Standard Sanitary Corp., *Secretary*

Walter S. L. Cleverdon, New York University  
John S. Coe, Chase Brass and Copper Co., Waterbury, Conn.

Edward S. Cornell, Jr., American Radiator and Standard Sanitary Corp., New York

E. A. Frederickson, Crane Company, Chicago  
George W. Martin, U. S. Realty and Improvement Company, New York

Ross Martin, Northern Indiana Brass Company, Elkhart, Ind.

Frank E. McCabe, The Grabler Manufacturing Co., Cleveland, Ohio

Jere L. Murphy, Contracting Plumber, New York, N. Y.

## Bureau of Standards Issues New Oil Tables for Accuracy

In order to meet the demand of the oil industry for tables containing information on oils having a specific gravity greater than 1.000 at 60/60 deg F, the National Bureau of Standards has prepared a new circular, C410, National Standard Petroleum Oil Tables, which replaces an older pamphlet C154.

The new circular contains all the tables in circular C154 and, in addition, tables 1, 2, 4, and 5 are extended to include the heavy petroleum products not covered in the original publication. The degree A.P.I. tables are extended to include the range 10 to 0 degrees A.P.I. at 60 F.

These extended tables issued by the Bureau present complete volume correction tables for use by the petroleum industry when a high degree of accuracy in determining oil volumes is required. Where extreme accuracy is not required for reducing oil volumes to the basis of 60 F, the standard abridged volume correction tables for petroleum oils (Z11.1-1934; A.S.T.M. D 206-34) are customarily used. Data for the standard table was prepared by the Bureau and published as a supplement to circular 154.

Copies of the circular C140 are obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 20 cents each.

## Need Uniform Regulations For Use of Reflectors

The efforts of highway departments and motor vehicle commissioners to reduce accidents on the highway have brought to the fore the need for uniform regulations concerning reflectors for motor vehicles, according to an article in *Fleet Owner*, December, 1935.

Many states have passed laws making the use of reflectors compulsory, and several of these states require that reflectors to be approved must meet the standard recommended by the Illuminating Section of the Society of Automotive Engineers. Vehicles carrying unapproved signals are being stopped on the highways by state police.

According to J. E. Eshbaugh, research engineer of the AC Spark Plug Company, who is an authority on reflector signals, *Fleet Owner* reports, the phenomenal development of the motor vehicle during the past 20 years, bringing with it higher speeds and better roads has forced upon us the necessity of safety devices. One of these, the reflector, returns a bright warning signal when the headlights from another vehicle are

played upon it. It serves as a protection when vehicles have poor or possibly no tail lights at all.

"In developing reflectors," Mr. Eshbaugh said, "many factors which have an effect on the efficiency of the device such as fog, rain, road curvatures, hills, temperature, salty seacoast atmosphere, long life, dust, etc., must be taken into consideration. Reflecting glass prisms must maintain their high efficiency indefinitely, and a signal must be visible close-on and at angles as well as at distances of 500 to 1,000 feet."

The S.A.E. standard for reflectors is set up to provide the most efficient type of reflector and consequently the greatest safety for motor vehicles.

## Oklahoma Inspection Bureau Uses American Standards

"Eternal vigilance is the price of safety" is the slogan of the new *Bulletin* published by the Bureau of Factory Inspection, Department of Labor, State of Oklahoma, and the *Bulletin* proceeds to give detailed information as to what is meant by "vigilance." The book, in addition to the Oklahoma laws governing the inspection and regulation of factories and other places where labor is employed, also gives a digest of safe practices and methods of eliminating industrial hazards on unguarded machinery, improper ventilation, lighting, ladders, electrical equipment, and in spray painting.

The American Standard safety codes are abstracted wherever such codes are available in solving particular safety problems in factories.

The staff of the American Standards Association assisted W. Pat Murphy, Oklahoma Commissioner of Labor, in the preparation of this *Bulletin*.

## Standards for Fan Belts, Pulleys Considered by S.A.E. Committee

Adequate standards for fan belts and pulleys are on the program of the Gasoline Engine Division of the Standards Committee which has adopted a plan for an early revision of the present S.A.E. Standard with the cooperation of the Rubber Association of America.

This will be welcome news to the engine and vehicle manufacturers who have found troublesome the lack of adequate standardization of these products. Car owners will also benefit with the revision of this standard which, though satisfactory when published, has been obsolete by more recent practice.—S.A.E. Journal, January.



## Wharton Clay Takes Charge Of ASA Promotion Work

Wharton Clay, formerly senior engineer of the Works Progress Administration and widely experienced in trade association work, has joined the staff of the American Standards Association to take charge of the promotion department of the Association. He succeeds Leslie Peat, formerly in charge of promotion and editor of *INDUSTRIAL STANDARDIZATION*, who left the ASA to join the staff of the McGraw-Hill publication, *American Machinist*.

After graduating from the University of Illinois as an Architectural Engineer, Mr. Clay became superintendent of building construction, and later joined the staff of the U. S. Gypsum Company as sales engineer. He became aide to the Secretary of War from 1916 until 1919.

For ten years until 1930 he was Commissioner for the Associated Metal Lath Manufacturers and was a frequent contributor to the building press and member of many building code and other committees. He cooperated with the Government for his industry in standardization of the product and in the establishment of Federal Specifications. As a result of promotion activities of the association during this period, the use of metal lath was increased over 450 per cent.

In 1930 he joined the Executive Staff of the Trucon Steel Company as promotion engineer.

He has also acted as Director of the Trade Association Section of the NRA, the branch which was responsible for the development of trade associations in unorganized industries and to aid



*Wharton Clay*

them toward industrial self government. Later he was a member of the Construction and Realty Division of the Federal Housing Administration, and Industry Advisor.

In addition to the problem of keeping the member companies informed of the progress of standardization, the promotion department cooperates with the membership in advancing the use of approved standards.

## Standard Colors and Finishes For Cast Stone Help Architects

A pamphlet, *Colors and Finishes for Cast Stone*, Commercial Standard CS 53-35, which lists a series of standard samples of cast stone for the more commonly selected finishes and colors available in that material, has just been published by the Government Printing Office.

These standard colors and textures were selected by a committee of architects, and include rubbed, brushed, etched, and bush-hammered finishes, and buff and gray colors. These master samples are on file at the National Bureau of Standards as standards of reference. They have been duplicated by the Cast Stone Institute for distribution to architects, manufacturers, and others concerned with the production and use of cast stone.

It is not the purpose of this standard to limit the range of colors, textures, and finishes in cast stone. Under its present scope it merely sets up tangible examples of the most frequently occurring colors and finishes. These samples provide standards of comparison by which cast stone of these particular colors and finishes can be specified and judged. To the extent that they exemplify cast stone of enduring and pleasing appearance these samples provide a standard of comparison for all cast stone regardless of color and finish.

The pamphlet includes a brief history of the project, a list of the official acceptors, and the membership of the standing committee.

Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at five cents each, or from the American Standards Association.

## New A.S.T.M. Tests Give More Data On Electrical Insulating Materials

At a two day session, March 19 and 20, A.S.T.M. Committee D-9 on Electrical Insulating Materials reported progress in its work. In addition to completing work on revisions of standard and tentative specifications and tests, such items as test cells for power factor and resistivity measurement of insulating oils, dielectric strength test of sheet and tape material, and conditioning requirements were discussed. In connection with insulating oils, Committee D-9 has been attempting to secure a suitable test cell which would be inexpensive but at the same time accurate and convenient to use. Several types of cells have been compared, and the laboratory results caused considerable discussion about the extremes in accuracy which might be desired by different interests, such as cable oil manufacturers, cable manufacturers, and operating companies.

### Propose Revision

The committee is proposing a complete revision of the Tentative Methods of Testing Electrical Insulating Materials for Power Factor and Dielectric Constant (D 150 - 35 T). In this revision, the limits of accuracy of the different methods recommended are discussed. In order to summarize and interpolate the large amount of data on life tests collected by Subcommittee IV on Insulating Mineral Oils, the chairman, E. A. Snyder, Socony-Vacuum Oil Co., and F. M. Clark, Physicist, General Electric Co., have prepared a paper for presentation at the A.S.T.M. annual meeting in Atlantic City. This will give an up-to-date picture of the present status of our knowledge of oxidation and sludging of oils. This subcommittee announced it is now ready to undertake round-robin tests to determine gas content of insulating oil.

A round-robin series of tests is to be undertaken in connection with the development of standard molds for use in testing molded materials. Another round-robin test is in progress dealing with power factor measurements of natural mica. This work is one of considerable technical difficulty and the committee now believes that it has developed a method due to the application of pressure on the electrodes which appears very promising. Under the sponsorship of Subcommittee III on Plates, Tubes, and Rods, a test series to study heat distortion of insulating plates is to be started and this subcommittee plans other tests in connection with identifying grades.

One activity of Subcommittee VIII on Papers and Fabrics deals with the dielectric strength of tape material. The A.S.T.M. requirements have

been criticized and study of the situation has resulted in definite work on the part of Committee D-9 to provide a method which will be satisfactory to all concerned.

The Special Subcommittee on Conditioning has been attempting to standardize the methods within the committee as far as possible. At the present time, it is undertaking a study of ovens with a view to developing a standard oven. In this work it will contact the manufacturers so that the final product will be satisfactory from a test standpoint and economical to produce.

Officers of Committee D-9 are: Chairman, T. Smith Taylor, Professor of Physics, Washington & Jefferson College, Washington, Pa.; Secretary, E. J. Rutan, Superintendent Test Bureau, The New York Edison Co., Inc., 92 Vandam St., New York City.

### Members Must Follow British Standards, Association Rules

Agreement to work strictly in accordance with the specifications and recommendations of the British Standards Institution, and of the Department of Scientific and Industrial Research, has been made a condition of membership by the new British Jointless Flooring (Oxychloride) Association. Members of the association will be individuals, firms, or companies laying magnesite flooring or furnishing materials used in such flooring.

Specifications for the manufacture of magnesite composition flooring and for materials to be used in the manufacture of magnesite composition have already been recommended to the British Standards Institution.

### Suggest Changing Blanket Sizes in Simplified Practice Recommendation

The standing committee in charge of Simplified Practice Recommendation R11, Bed Blankets, has submitted a revision of the recommendation, and the Division of Simplified Practice of the National Bureau of Standards has mailed copies to all interests for consideration and approval.

The original recommendation established a simplified schedule of 12 sizes of bed blankets ranging from 54 x 76 inches to 80 x 90 inches.

The current revision eliminates the 64 x 76 and the 68 x 80 sizes and substitutes size 66 x 76.

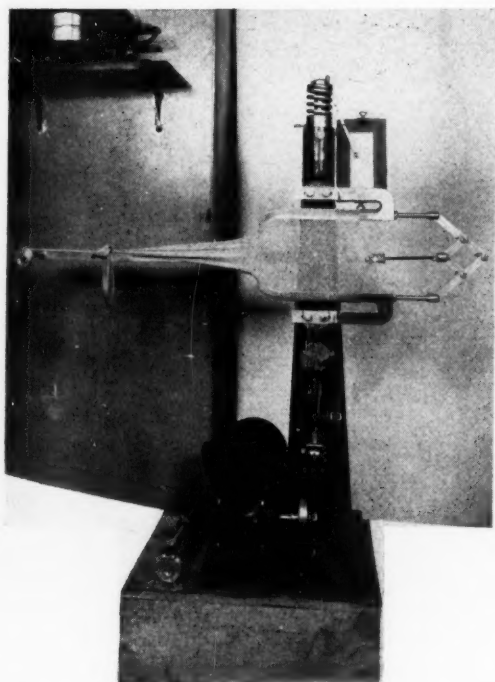
Copies of the proposal, in mimeographed form, may be obtained from the Division of Simplified Practice, National Bureau of Standards, Washington, D. C.

## Standard Tests Show How Stockings Wear<sup>1</sup>

A STOCKING should be capable of considerable distention in the region of the welt and upper leg, that is, it should not be skimpy, if it is to give satisfactory service and comfort. It should be sufficiently elastic to accommodate itself to the shape of the leg of the wearer and it should not lose this elasticity and become baggy after a period of use. It should have sufficient strength to resist the development of holes or runs when repeatedly distended.

The hosiery testing machine, illustrated in the accompanying photograph, has been developed at the National Bureau of Standards as a result of the request made by the General Federation of Women's Clubs for cooperation in the development of a specification for women's hosiery to serve as a basis for the labeling of standard grades. This machine provides a convenient

<sup>1</sup>Publication approved by the National Bureau of Standards.



### Machine Used by National Bureau of Standards Reproduces Effects of Actual Conditions of Wear

means for measuring the behavior of a stocking when the upper part of the leg of the stocking is repeatedly distended in a way which subjects it to forces similar to those at the knee and the garter clasps of a stocking in use. The stocking is held on the jaws of the machine by garter clasps. Tension is applied by a weight attached to the ankle. The machine distends the stocking repeatedly from a circumference of 13.3 to 21.3 inches. The pull exerted on the fabric during each flexing cycle and the circumference are recorded on a chart. The "distensibility" or ease with which the stocking can be distended, "recoverability" or ability of the stocking to retain its shape after being repeatedly distended, and "stretch-endurability" or number of flexing cycles to failure are evaluated.

On the basis of information reported in National Bureau of Standards Research Papers RP679 and RP753 and in Miscellaneous Publication M149 the following recommendations are made:

The stocking to be tested on the machine should be laundered in accordance with the standard procedure.

The "distensibility," defined as the ratio of the increase in circumference to the increase in load when the load is increased from 20 to 30 pounds in the first cycle of the test, should be not less than 0.11 inch per pound.

The "recoverability," defined as the circumference of the stocking at a load of 30 pounds in the first flexing cycle expressed as a percentage of the circumference at a load of 10 pounds in the 200th flexing cycle, should be not less than 96 percent.

The "stretch-endurability," defined as the number of flexing cycles required to produce a failure, that is, a hole or run in the stocking, should be not less than 1,000 flexing cycles.

## A.S.T.M. Starts Work On Soap Standards

A new committee, to undertake the development of standard specifications and methods of test for soap and other detergents, is now being organized, the American Society for Testing Materials just announced.

Soap products are used in many industries for a variety of purposes. In the automotive field, soap is used for cleaning before refinishing and after rubbing down, and also for coating the spraying booths. Brush makers use soap in scouring and softening the fibers, while in the foundry industry use is made of soap on the inside of molds to aid stripping. Certain gas companies use soap solutions to detect gas leaks; and in the paper industry use is made of soap products for washing paper-machine felts, and of rosin soap for sizing.

Although the exact scope of the new committee and definite outline of its activities will be decided by the committee at its organization meeting, the special committee in charge of the organization has indicated that at first its work might be limited chiefly to soaps in general (liquid, cake, powder, etc.), soap powders, and cleaners. The committee later may undertake development of standards for other detergents, and may investigate the question of detergency itself and of oils used in soap making.

The organizing committee which is developing the personnel is headed by H. P. Trevithick, Chief Chemist, New York Produce Exchange. In this new work, the American Society for Testing Materials will cooperate closely with other organizations which have undertaken standardization activities, including test methods, so that there may not be unnecessary duplication of effort.

## Tables of Weights and Measures Issued by Bureau of Standards

Definitions and tables of equivalents of the customary weights and measures of the United States, and the metric system, are given in a new publication of the National Bureau of Standards, Miscellaneous Publication M121, released last month.

This compilation supersedes the National Bureau of Standards Circular C47, issued in 1914, which has been out of print for some time.

The new publication contains the table of millimeter-inch equivalents formerly printed as a supplement to C47; the chart showing a graphic comparison of screw-thread pitches, originally published as Miscellaneous Publication M49;

and the metric-English distance equivalents for athletic events which have heretofore appeared as Letter Circular LC376.

The fundamental equivalents and the definitions of the units are clearly set forth, and the difference between units and standards is briefly explained. The methods adopted for maintaining the standards with the required degree of precision are described.

Copies are available from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 15 cents each.

## ASA Approves Commercial Standard For Cloths for Bookbinding

The Commercial Standard for Book Cloths, Buckrams, and Impregnated Fabrics for Bookbinding Purposes Except Library Bindings (CS 57-36) has just been approved as an American Tentative Standard by the American Standards Association.

The standard gives definitions, general and specific requirements for quality of fabrics, and test methods for determining compliance with the standard.

The document was submitted to the American Standards Association as the result of a request by the Employing Bookbinders of America and the Book Manufacturers Institute, which with the cooperation of the Institute of Book Cloth and Impregnated Fabrics Manufacturers asked the assistance of the National Bureau of Standards in the establishment of the Commercial Standard in October, 1935.

Copies of the standard are available from the ASA office or from the Institute of Book Cloth and Impregnated Fabrics Manufacturers, 103 Park Avenue, New York.

## Simplified Practice Recommendation For Beds Reaffirmed Without Change

The Simplified Practice Recommendation R2-32, Beds, Springs, and Mattresses, has been reaffirmed without change by the standing committee of the industry, the Division of Simplified Practice of the National Bureau of Standards announced recently.

This simplification program establishes standard dimensions for straight-foot wood beds, straight-foot metal beds, bow-foot beds, springs, and mattresses.

Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at five cents each.



## Standardization Vital in Reducing Costs, Says Head of New Zealand Institution

"Standardization is a vital first principle for the elimination of waste and reduction of costs," said M. G. C. McCaul, Acting-Chairman of the New Zealand Standards Institution, at the Annual Meeting of the Institution, recently. "The general principles of standardization must be adopted in New Zealand in every branch of industry and effort if we are to succeed as a nation in competition with producers and manufacturers overseas."

Fifty-one approved specifications, and completion of a proposed National Building Code, is the record for the past year reported at the annual meeting of the Institution.

Among the more important projects scheduled for consideration during the coming year, it was reported, are the Empire Color Schedule, referred by the British Standards Institution to the national standardizing bodies of the British Empire for approval as an Empire standard, and a project on textile standards. Information on textile standards has been collected for use on this project from Great Britain, Australia, and America.

### 94 Standards Endorsed

Speaking of the standards work being done by the New Zealand Standards Institution, Mr. McCaul said:

"The 94 standards so far endorsed by the New Zealand Institution mostly relate to engineering supplies, approximately half being concerned with electrical equipment. A few are necessary basic standards, as for example standard nomenclature, definitions, and symbols for welding and cutting, the standard Glossary of Aeronautical Terms, and standard definitions of gross and net calorific values. Standards recently dealt with by technical committees but not yet officially endorsed by the Institution include some of special interest to the mining industry.

"In every field of standardization, the first step is to establish standard nomenclature, definitions and symbols. The next stage involves the standardization of practice in respect to forming samples, the equipment for tests, and procedure in making tests.

"In these and every subsequent step the essential function of the British Empire standardizing bodies is to bring together into consultation the representatives of all interests concerned, including the consumers, with the object of issuing au-

thoritative, agreed definitions of what is best in current practice.

"It is my conviction that this young country will never be really successful in its manufacturing industries unless thought, time, and money are spent upon scientific experiment, development, and standardization. The patronage of the public is being extended more and more to articles of easily identified standard grades and qualities that can be relied upon. As the public becomes better educated and more and more discerning in its buying, this tendency will increase.

"The general principles of standardization must be adopted in New Zealand in every branch of industry and effort if we are to succeed as a nation in competition with producers and manufacturers overseas.

"Standardization is a vital first principle for the elimination of waste and reduction of costs."

### Drawing Text Book Conforms to American Standard in New Edition

An American Standard has been used in the recent revision of a "standard" text book widely known for 20 years. The fifth edition of *French's Engineering Drawing* is a thoroughly revised edition of the well-known manual and conforms in text and illustrations to the American Standard for Drawings and Drafting Room Practice recently approved by the American Standards Association.

The book, by Thomas E. French, is published by McGraw-Hill Book Co., New York, 481 pages, 6 x 9 inches, price \$3.00.

### American Flag Colors Standardized by U. S.

The red, white, and blue colors of the American flag have been standardized through the efforts of the Federal Specifications Board, in cooperation with the Textile Color Card Association of the United States, Inc., it was announced at the twenty-first annual meeting of the association by Margaret Hayden Rorke, its secretary and managing director. The standards soon will be published by the association in an official color card.

## Foreign Standards For Sale by ASA

Use serial number when ordering any of the foreign standards listed below. Address a postal card or letter, with name of person to receive the pamphlets, to:

American Standards Association,  
29 West 39th Street,  
New York.

*Standards are printed in language of the country under which they are listed.*

### Great Britain

- 795. Diethyl phthalate
- 796. Carbon tetrachloride
- 797. Glacial acetic acid and dilute acetic acids
- 798. Hexachlorethane (hexachloroethane)
- 799. Technical acetic acids
- 800. Technical ether
- 801. Trichlorethylene (trichloroethylene) (technical and stabilized)
- 802. Electrically driven point-operated machines for railways
- 803. Dimensions and workmanship of asbestos cement spigot and socket soil, waste, and ventilating pipes and fittings
- 804. Wooden gates
- 805. Wood mouldings
- 806. Wooden stairs
- 807. Photoelectric cells of the emission type for sound film apparatus
- 808. Motor starters and controllers (excluding liquid starters and controllers and single-phase a-c models)
- 809. Grading for plywood veneered with oak, mahogany, walnut, teak, and other oriental woods
- 810. Nomenclature of softwoods (including botanical species and sources of supply)
- 811. Electrically welded mild steel chain, short link and pitched or calibrated
- 812. Wrought-iron and mild steel hooks of the "C" or Liverpool type
- 813. Steel castings for general engineering purposes
- 814. General purpose laboratory thermometers
- 815. Rolled asphalt, fluxed lake asphalt and asphaltic bitumen (hot process)
- 816. Rolled asphalt, fluxed natural asphalt and asphaltic bitumen (hot process)
- 817. Mastic asphalt surfacing, fluxed lake asphalt and asphaltic bitumen (hot process)
- 818. Mastic asphalt surfacing, fluxed natural asphalt and asphaltic bitumen (hot process)
- 819. Pump tests
- 820. Steel sheets for transformers for power and lighting
- 821. British standard specifications applicable to building works for use by those engaged in building and its allied trades (list)

### Germany

- 822. Business letter heads, standard size A 4 (210 x 297 mm)
- 823. Bill heads, standard sizes A 4, A 5, A 6
- 824. Cold rolled aluminum sheets
- 825. General specifications for awarding contracts in the building trades
- 826. General specifications for the execution of contracts in the building trades
- 827. General survey sheet showing technical requirements for building electrical installations, established by the Government Contracts Committee

- 828. Dimensions of wire cloth for testing sieves
- 829. Methods of test and testing apparatus for wire cloth for testing sieves
- 830. Mathematical symbols
- 831. Wire rope for cranes, hoists, pulleys, and similar apparatus

### Canada

- 900. Standard dimensions for building brick

## Marketing Officials' Survey Shows Many States Have Egg Standards

Research into laws for standards and grading of eggs throughout the United States, recently completed by the National Association of Marketing Officials, shows that 15 states are using the United States standard grades, worked out by the Bureau of Agricultural Economics. In addition, 20 states have state standards, some differing only slightly from the Federal standards. In ten of these states the grading of eggs is compulsory.

Size of eggs as well as grading is valuable information for the consumer, and 24 states define standard sizes for the eggs sold within their borders.

The standard grade names used and an analysis of the findings of the survey by the National Association of Marketing Officials are given in the February 24 issue of the Consumers' Guide, published by the U. S. Department of Agriculture.

## Says Paint Standardization Would Help Make Profits

Simplification of colors and containers is one of the most constructive ends toward which the paint industry can move. A weeding-out process can take place only when manufacturers, wholesalers, and dealers as a group cooperatively abandon duplicating lines, reduce to a minimum of standard shades, and carry only those items for which there is a reasonable demand.

A study made some time ago in the wholesale paint field by the Bureau of Foreign and Domestic Commerce revealed duplication of items and an excessive variety of sizes and kinds indicating that slow turn-over was largely responsible for the losses in the paint and varnish departments. The profit showing of this house would have been considerably improved had it adopted a strong program in the simplification of inventories.—*From an Address by S. L. Kedzierski, Chief, Wholesale Trade Section, Marketing Research and Service Division, U. S. Department of Commerce, before the National Paint, Varnish and Lacquer Association, October 29, 1935.*

## Increase Magazines' Usefulness, New Standard Recommends

Rules to make periodicals easier to use have been formulated for the first time in an American Recommended Practice approved by the American Standards Association.

"Periodicals reach their highest degree of usefulness only if they can be readily referred to in libraries by the millions of people who want to consult them," says the new American Recommended Practice for Reference Data for Periodicals.

In an effort to make it easier for the public to use the magazines, the American Standards Association, at the request of the American Library Association, brought together representatives of the publishers and of the libraries to agree on rules which should be followed by all periodicals. Uniform location of information about the

periodical, continuous paging of the magazine throughout a volume so that articles can be easily located, use of Arabic rather than Roman numerals, are some of the more obvious rules laid down in the recommendations.

These recommendations represent the practice now followed by the majority of publishers, and concern relatively simple and inexpensive practices which would solve the difficulties that librarians now experience. The recommendations are meant to be filed in each publisher's office, in such a manner that they may be referred to by editorial and make-up people, and put into practice wherever possible.

Copies of the new standard are available from the American Standards Association at 15 cents each.

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## LIGHTNING ARRESTERS

### The Safety Valves of Electric Systems!

New American Standard tests show comparison between different types of lightning arresters, and what protection they can be expected to give.

A large number of electric lines, power stations, and much power station equipment are now protected by lightning arresters.

**American Standard for Lightning Arresters (C62-1936) - - 30 cents**

(Service conditions, definitions, classification, rating, characteristics and performance, and standard tests for Lightning Arresters are included. Prepared by the American Institute of Electrical Engineers.)

Copies are available from the American Standards Association. Members of the ASA are entitled to 20 per cent discount on all approved American Standards ordered from the ASA office.

**American Standards Association**

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During the millions of years of the earth's history, Noise has gone unchecked and uncontrolled. Now we have basic standards for the measurement of Sound as fundamental as foot and pound standards are in the measurement of length and weight.

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*The American Tentative Standards for Sound Level Meters (Z24.3-1936)* . . . . . 25 cents

Standardize essential meter characteristics so that the same result will be indicated for the same sound by any standard meter.

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